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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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5245

7590

01/18/2007

US Philips Corporation

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BRIARCLIFF MANOR, NY 10510-8001

EXAMINER

JARRETT, SCOTT L

ART UNIT

PAPER NUMBER

3623

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/18/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/069,742

Applicant(s)

VERHAEGH ET AL.

Examiner

Scott L. Jarrett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. This **Final** Office Action is in response to Applicant's amendment filed October 7, 2006. Applicant's amendment amended claims 1-10 and added new claims 11-14. Currently Claims 1-14 are pending.

***Response to Amendment***

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.

***Response to Arguments***

3. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

***Information Disclosure Statement***

4. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Examiner requests a copy of the following reference, as recited on Page 13 Lines 22-25 of the Specification, Anderson et al., Machine Scheduling.

***Title***

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Method for Determining a Schedule for a Plurality of Tasks having Associated Start Times, End Times and Processing Speeds.

***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 1-14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding Claims 1-14, for a claimed invention to be statutory, the claimed invention must produce a useful, concrete, and tangible result.

In the present case, the scheduler and/or the method of scheduling merely represent a collection/compilation of schedule and resource data, while the compilation of data may have some have some real world value (i.e. utility/usefulness) there is no requisite functionality present to satisfy the practical application requirement nor are there any "acts" which transform the data and/or cause a physical transformation to occur outside the method/scheduler (i.e. not concrete or tangible) therefore the invention as claimed does not produce a useful, concrete, *and* tangible result.

Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored in a computer-readable medium, in a computer, on an electromagnetic carrier signal does not make it statutory. See *Diamond v. Diehr*, 450 U.S. 175, 185-86, 209 USPQ 1, 7-8 (1981) (noting that the claims for an algorithm in *Benson* were unpatentable as abstract ideas because "[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer."). Such a result would exalt form over

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substance. In re Sarkar, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978) (“[E]ach invention must be evaluated as claimed; yet semantogenic considerations preclude a determination based solely on words appearing in the claims. In the final analysis under 101, the claimed invention, as a whole, must be evaluated for what it is.”) (Abele, 684 F.2d 902, 907, 214 USPQ 682, 687(CCPA 1982)). See also In re Johnson, 589 F.2d 1070, 1077, 200 USPQ 199, 206 (CCPA 1978) (“form of the claim is often an exercise in drafting”). Thus, nonstatutory music is not a computer component and it does not become statutory by merely recording it on a compact disk. Protection for this type of work is provided under copyright law.

Further regarding Claims 6-14 the invention as claimed is directed to non-statutory subject matter wherein claims recite a “scheduler” which does not does not fall within at least one of the four categories of patent eligible subject matter recited in 35 U.S.C. 101 (process, machine, manufacture, or composition of matter) wherein the scheduler is at best a software module that is not embedded on a computer readable medium and/or executable by a computer.

Examiner interpreted the claims to be directed to a computer-implemented method for the purposes of examination.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 6-8 and 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Abeni et al., Integrating Multimedia Applications in Hard Real-Time Systems (1998).

Regarding Claims 1, 6 and 10 Abeni et al. teach a system and method for determining a schedule (scheduler) comprising (Abstract; Figures 1-3, 10-13):

- constructing a set of task (activity, job, etc.) constraints given task and resource limitations/requirements (Column 1, Page 2; Column 2, Paragraphs 1-3, 7, Page 2; Column 2, Paragraphs 2-3, Page 3);
- determining for each task a relative start time (beginning, release, etc.), relative end time (deadline, due, delivery, completion, etc.) and a resource assignment (bandwidth, CPU reservation, size, rate, etc.) based on the constraints (Column 1, Last Paragraph, Page 1; Column 1, Last Paragraph, Page 2; Column 2, Paragraphs 1-2, Page 2; Column 1, Bullet 1, Page 3; Column 2, Paragraphs 1-3, Page 3; Column 1, Paragraph 1, Page 6; Column 1, Paragraph 2, Last Paragraph, Page 7);
- determining for each task an absolute (actual, definite, finite, complete, ideal, immutable, scheduled, etc.) start time, end time (Column 2, Paragraphs 1-2, Page 2;

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Column 1, Bullet 1, Page 3; Column 2, Paragraphs 1-3, Page 3; Column 2, Paragraph 1, Page 4; Column 1, Paragraph 1, Page 9) and a collection (list) of times (Column 2, Paragraphs 1-4, Page 3; Column 1, Page 5; Figures 3-4) and associated task processing speeds (execution time, rate, duration, etc.), based on the start/end times and assigned resources (Column 2, Last Paragraph, Page 2; Figures 1-2, 10-13);

- determining a schedule for task having an absolute start time, absolute end time, a collection of times, task processing speeds and assigned resources (Abstract; Column 2, Page 3; Figures 1-2).

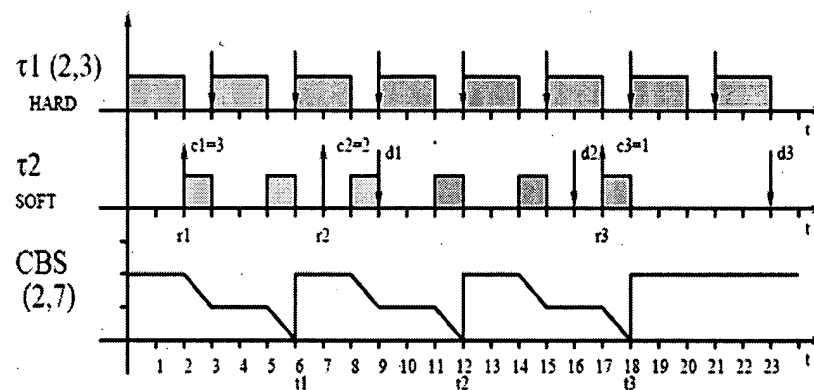


Figure 1. An example of CBS scheduling.

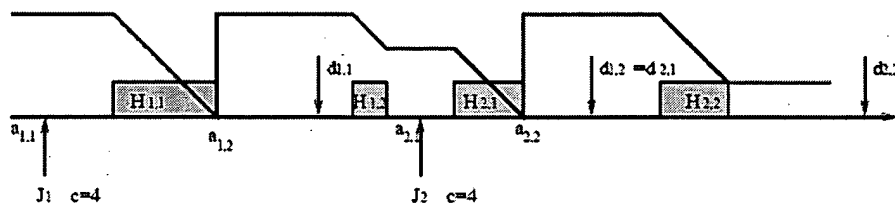


Figure 2. Example of jobs divided to chunks.



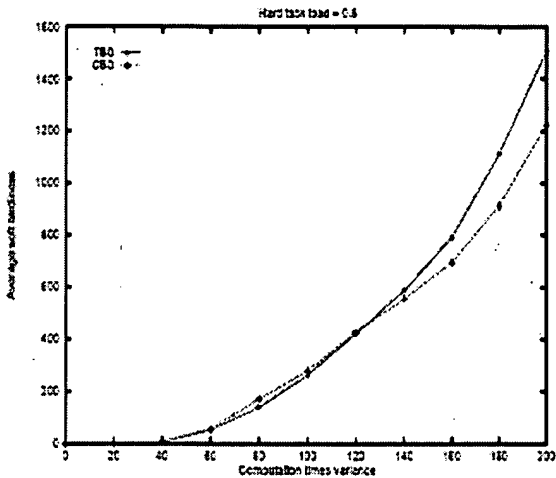


Figure 10. Fourth experiment.

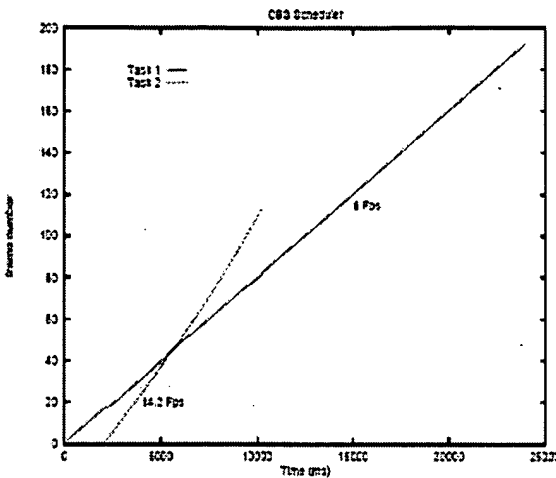


Figure 12. Two MPEG players scheduled by CBS.

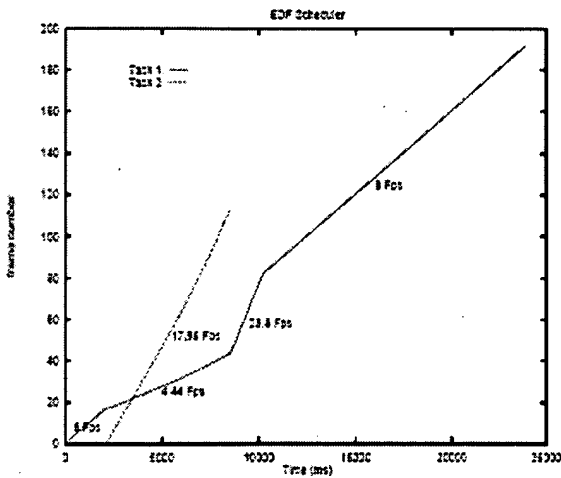


Figure 11. Two MPEG players scheduled by EDF.

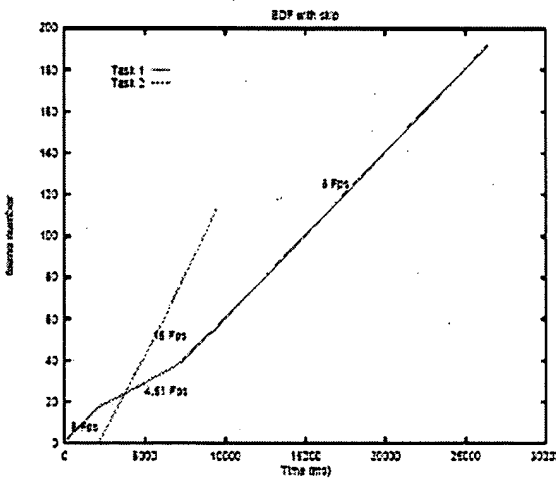


Figure 13. Two MPEG players scheduled by EDF with skip.

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Regarding Claims 2 and 7 Abeni et al. teach a scheduling system and method further comprising:

- defining a sequence of windows (time slots, slots, intervals, periods, frames, time frames, etc.; server period, budget, etc.), a starting window corresponding to the relative starting time and relative ending time of a task wherein the ending time of the window corresponds to a starting time of a next window (Column 1, Bullets 1-2, Page 3; Column 2, Bullets 2-3, Paragraphs 1-4, Page 3; Figures 1-2);
- determining an absolute length of the windows in the sequence (Column 1, Paragraphs 1-2, Page 5);
- determining for each window a processing speed for each task (rate, execution time, etc.; bit rate) and creating for each task a collection of times and associated processing speeds (Column 2, Paragraphs 1-4, Page 3; Figures 1-2, 10-13); and
- determining for each task the absolute starting time and absolute ending time from the absolute length of the windows (Column 2, Paragraphs 1-3, Page 3; Column 2, Paragraphs 1-2, Page 2; Column 1, Paragraphs 1-2, Page 5).

Regarding Claims 3 and 8 Abeni et al. teach a scheduling system and method further comprising:

- determining whether any violation of the constraints has occurred (Figure 3);
- determining at least one new relative starting time, a new ending time and a new resource assignment for a task when any constraint violation has occurred

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(Column 2, Paragraphs 1-3, Page 3; Column 1, Last Paragraph, Page 3; Column 2, Paragraph 1, Page 4; Figure 3).

Regarding Claim 11 Abeni et al. teach a scheduling system and method further comprising determining a new processing speed duration execution of a task (rate adaptation, rate based execution, etc.; Column 1, Bullet 1, Page 1; Column 2, Paragraph 2, Page 1; Column 2, Paragraph 6, Page 2; Column 1-2, Page 8; Figures 2, 10-13).

Regarding Claim 12 Abeni et al. teach a scheduling system and method wherein the processing speed is varied during the execution of a task (Column 1, Bullet 1, Page 1; Column 2, Paragraph 2, Page 1; Column 2, Paragraph 6, Page 2; Column 1-2, Page 8; Figures 2, 10-13).

Regarding Claim 13 Abeni et al. teach a scheduling system and method wherein the collection of times are time points at which the processing speed of the task is changed to the task processing speed associated with that time point (Column 1, Bullet 1, Page 1; Column 2, Paragraph 2, Page 1; Column 2, Paragraph 6, Page 2; Column 1-2, Page 8; Figures 2, 10-13).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 4-5, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abeni et al., Integrating Multimedia Applications in Hard Real-Time Systems (1998) as applied to claims 1-3, 6-8 and 10-13.

Regarding Claims 4-5 and 9 Abeni et al. does not expressly teach that the scheduling system utilizes well-known linear programming techniques/methods as claimed.

Official notice is taken that utilizing linear (integer, constraint) programming techniques and/or methods to solve scheduling and/or optimization problems, such as as determining and/or optimizing feasible schedules for a plurality of tasks requiring a plurality of resources is old and very well known. See at least Specification, Lines 20-24, Page 4; Junker et al., A Framework for Constraint Programming Based on Column Generation (1999) and Joslin et al., U.S. Patent No. 6,272,483 (Columns 1, 6-8).

It would have been obvious to one skilled in the art at the time of the invention that the system and method for task scheduling as taught by Abeni et al. would have

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benefited from utilizing any of a plurality of well known techniques including but not limited to linear programming to solve/optimize the scheduling process in view of the teachings of official notice.

Regarding Claim 14 Abeni et al. teach a scheduling system and method wherein two subsequent times in the collection of times encompass a time interval during which the task processing speed remains constant (Column 1, Paragraph 1, Page 6; Figures 1-2, 10-13).

Abeni et al. does not expressly teach that the task processing speed remains constant at the level associated with the lowest of the two times as claimed.

Official notice is taken that adjusting the rate of a task (job, activity, processing time, etc.) to the lower value of two or more points is well known for example schedulers routinely determine schedules wherein the slowest processing step's rate gates/bottlenecks the overall process such that the schedule is driven/derived from the lowest task rate in the overall process.

It would have been obvious to one skilled in the art at the time of the invention that the system and method for task scheduling as taught by Abeni et al. with its ability to adjust and/or fix a task's processing speed to meet the time and/or resource

constraints of the process/schedule would have benefited from selecting a constant rate equal to the lowest rate of two times in view of the teachings of official notice.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Teng, U.S. Patent No. 4,642,758, teach a system and method for scheduling a plurality of tasks (file transfers) requiring a plurality of resources.

- Sherer et al., U.S. Patent No. 5,875,175, teach a scheduling system and method for scheduling a plurality of tasks (packets) based on time and resource constraints/limitations.
- Nakumura et al., U.S. Patent No. 5,913,039, teach a video on demand scheduling system and method.
- Miller et al., U.S. Patent No. 5,920,701, teach a scheduler system and method comprising a plurality of tasks (transmissions) each having variable processing speeds/rates (transfer rate) based on time (start/completion time, deadline) and resource constraints (bandwidth windows).
- Jones et al., U.S. Patent No. 6,003,061, teach a system and method for scheduling a plurality of tasks (activities) requiring a plurality of resources comprising determining for each task time-specific constraints (absolute deadline, start time) and resource constraints/requirements (time slices/windows).
- Boetje et al., U.S. Patent No. 6,049,332, teaches a scheduling system and method comprising (Abstract; Figures 2-5, 15, 17, 19): constructing a set of task (activity, job, etc.) constraints given task and resource limitations/requirements (Column 7, Lines 28-65; Column 15, Lines 6-45; Column 34, Lines 62-68; Column 35, Lines 1-19; Figure 6A); determining for each task a relative start time (beginning, release, delivery, etc.; soft starts), relative end time (delivery, completion, etc.) and a resource assignment (broadcast channel reserved) based on the constraints (offset, interrelationship – Start-Finish, etc.; Column 3, Lines 56-68; Column 14, Lines 26-59; Column 22, Lines 54-68; Column 23, Lines 1-20; Figures 3, 4A-4Z; Column 26, Lines

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11-34); and determining for each task an absolute (actual, definite, finite, complete, ideal, immutable, scheduled, etc.; hard starts) start time, end time, and a collection (list, SOM, EOM) of times and associated task processing speeds (execution time, rate, duration, etc.), based on the start/end times and assigned resources (Column 9, Lines 49-68; Column 14, Lines 26-59; Column 26, Lines 11-34) for the purposes of enabling the system to schedule untimed and/or live events (tasks, activities) by adjusting start times of related (associated, subsequent) tasks based on changes in start time and/or duration of the tasks (ripple effect/rules, time-independent event ordering; Column 2, Lines 32-56; Column 14, Lines 25-43; Column 26, Lines 11-35).

- Willard, U.S. Patent No. 6,374,405, teach a system and method for scheduling a plurality of tasks (modules) each having time (delivery/start time, relative time, transmission interval/window) and resource constraints/requirements and associated task processing speeds (bit rate).

- Willard et al., U.S. Patent No. 6,738,972, teach a system and method for determining a schedule (scheduler) comprising (Abstract; Columns 5, 7; Figures 2-5): constructing a set of task (activity, job, etc.) constraints given task and resource limitations/requirements (Column 4, Lines 57-68; Column 5, Lines 13-40; Figure 2); determining for each task a start time (beginning, release, delivery, etc.), relative end time (delivery, completion, etc.) and a resource assignment (broadcast channel reserved) based on the constraints (Column 1, Lines 33-65; Column 2, Lines 5-45; Column 4, Lines 65-68; Column 5, Lines 1-64; Column 7, Lines 23-51; Figure 5); determining for each task an actual (definite, finite, complete, ideal, immutable,



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scheduled, etc.) start time, end time, and a collection (list) of times and associated task processing speeds (execution time, rate, duration, etc.), based on the start/end times and assigned resources (Column 5, Lines 13-68; Column 6, Lines 1-65; Column 7, Lines 4-68; Figure 5); determining a schedule for task having a start time, absolute end time, a collection of times, task processing speeds and assigned resources (Column 1, Lines 33-65; Column 2, Lines 5-45; Column 4, Lines 65-68; Column 5, Lines 1-64; Column 7, Lines 23-51).

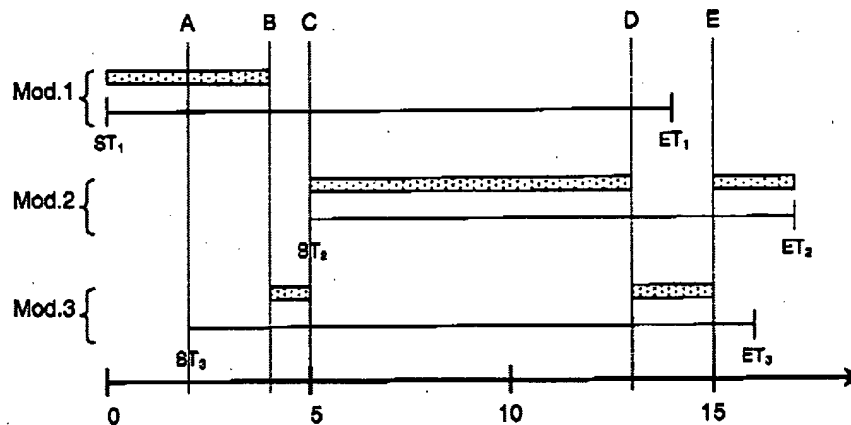


Fig. 5

- Vogl et al., U.S. Patent No. 7,0150,017, teach a scheduling system and method for scheduling a plurality of tasks (jobs) requiring a plurality of resources comprising constructing a set of constraints (criteria) and limitations for each task, determining relative and absolute start (release, deadline, time stamp completion, etc.) and end times, defining a sequence of windows (intervals) and determining for each task, window and/or collection of times (list) processing speed (transmit time, pacing

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information, rate). Vogl et al. further teaches changing the processing speed of tasks/windows.

- International Business Machines, EP 0759676 A2, teaches a system and method (scheduler) for scheduling a plurality of tasks (videos) requiring a plurality of resources (channels) wherein tasks processing rates/speeds are varied.

- Yau et al., Adaptive Rate Controlled Scheduling for Multimedia Applications (1997), teach a scheduling system and method for scheduling a plurality of tasks requiring a plurality of resources comprising constructing a set of time and resource constraints, determining both relative and absolute release and deadline and variable processing times for the tasks and generating task rate execution profiles.

- Nieh et al., The Design, Implementation and Evaluation of SMART (1997), teach a scheduling system and method utilizing well-known soft real-time constraints (deadline, processing time, etc.) and dynamically adaptive applications (tasks; i.e. variable processing times based on time/resource constraints).

- Buttazzo et al., Elastic Model for Adaptive Rate Control (1998), teach a scheduling system and method comprising varying task rates to meet timing and resource constraints during the execution/processing of the tasks (graceful degradation, task compression/decompression).

- Shin et al., Adaptation and Graceful Degradation of Control System by Task Reallocation and Period Adjustment (1999), teach a scheduling system and method wherein tasks are reallocated or adjusted to meet timing and/or resource constraints.

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- Abeni et al., Adaptive Bandwidth Reservation for Multimedia Computing (1999), teach a system and method for scheduling tasks whose execution times are unknown based on temporal and resource constraints.

- West et al., Dynamic Window-Constrained Scheduling for Multimedia Applications (1999), teach a scheduling system and method for scheduling a plurality of tasks requiring a plurality of resources (real-time multimedia applications) based on a deadline and a windowed loss rate. West et al. further teach a plurality of well-known task scheduling models/methods such as Static Priority, Start-Time Fair Queuing, Proportional Share and Cost Base Scheduling.

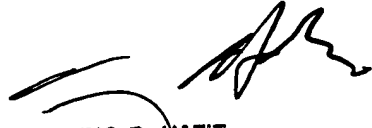
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott L. Jarrett whose telephone number is (571) 272-7033. The examiner can normally be reached on Monday-Friday, 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hafiz Tariq can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
SP  
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TARIQ R. NAFIZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3000